was agreed that in the graphical representation of alternating magnetic quantities advance in phase should always be represented in the counter-clockwise direction; in other words, the rotation of the vector should be to the left.

On the question of rating of electrical machinery and apparatus the proposals of the Brussels conference were adopted without modification as follows:—

1. The output of electrical generators is defined as the electrical power at the terminals.

2. The output of electrical motors is defined as the mechanical power at the shafts.

3. Both the mechanical and the electrical power are to be expressed in international watts.

In this work careful attention had to be given to the exact choice of the equivalent words in the two official languages. The convenient word "output" employed by English-speaking nations has no exact equivalent in French. In this case again a subcommittee, consisting of one member from those international committees interested in the subject was appointed to carry on further this question of the international rating of electrical machinery and apparatus.

It was decided that the next meeting of the Commission should be held in Berlin in 1913, the exact date to be announced later.

Mr. Gano Dunn, the president of the American Institution of Electrical Engineers, invited the Commission to hold an official meeting at San Francisco in 1915, on the occasion of the opening of the Panama Pacific Exhibition. On the motion of Prof. Feldmann, of Holland, seconded by Mr. W. Duddell, of England, the meeting thanked Mr. Dunn for the invitation, and stated its willingness to hold a meeting in San Francisco in 1915, and instructed the Central London Office to cooperate with the American Society in the organisation of an international electrical congress to be held at the same time.

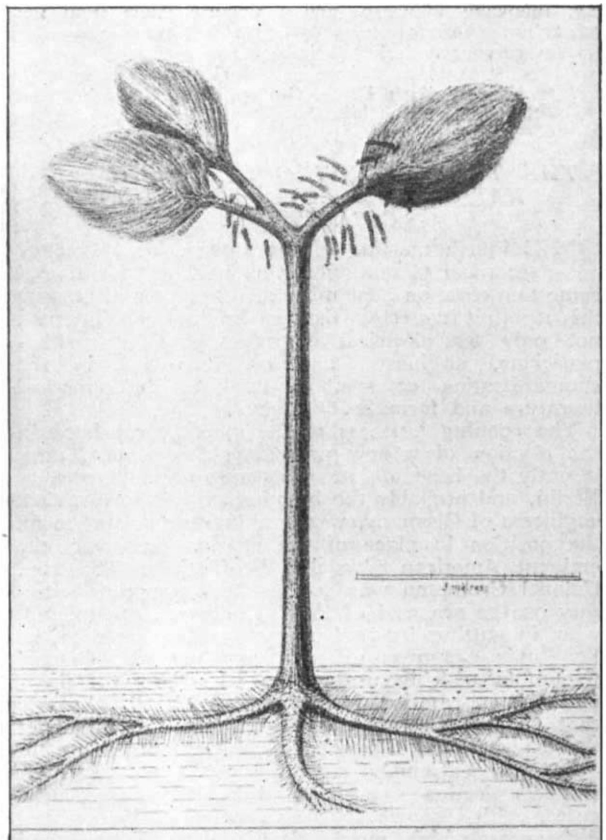
It is interesting to remark that at the meetings of the Electrical Congress, which was sitting at the same time, it was decided that for the future the irregular method of summoning international congresses at the time of the international exhibitions should be discontinued, and that in all cases where such exhibitions were held the International Electrotechnical Commission should be the body which should be invited by the country holding the exhibition to organise the electrical congresses, and in this way avoid much clashing and waste of effort.

Finally, the honorary secretary of the Illuminating Engineering Society of London, Mr. Leon Gaster, who was personally invited to attend this meeting at the invitation of the president, referred at some length to the desirability of standardising the terms and expressions used in connection with illumination. As stated above, this matter was dealt with by Prof. Elihu Thomson in his address. Mr. Gaster gave very cogent reasons why the present loose methods of expressing standards of light and of measuring these same standards should be discontinued, and that it was just as desirable in this kindred science of illumination that all nations should understand one another, as in the case of the electrical art and industry. Mr. Gaster's suggestions were strongly supported by Dr. Kennelly and Dr. Clayton Sharp, who are president and past president respectively of the Illuminating Society of the United States, and the suggestion that the various national committees be requested to put themselves in communication with their respective illuminating societies was unanimously adopted.

There is no doubt that at this full meeting of the International Electrotechnical Commission during the week in which the delegates worked together much international courtesy was shown, a great many pleasant friendships were made, and undoubtedly every additional international meeting of the kind greatly helps on the cause of solidarity between men of science of the world. The meeting room certainly contained a collection of men second to none in the electrical world for intellectual capacity; and that the meeting passed off so smoothly and so much work was done in a comparatively short time showed that the selectors of the delegates had also considered their diplomatic qualities, which had also been carefully studied by the countries which had sent them to the meeting.

PLANTS OF COAL-MEASURES.[1]

THE fossil flora of the Upper Carboniferous rocks of Belgian Hainaut is in many respects similar to that of our British coal measures, though many species occur in Belgium which are unrecorded from Britain and *vice versa*. Those who are interested in the systematic study of British Carboniferous plants will therefore find much that is of interest in Dr. Kidston's description of the collections, preserved in the Brussels Museum, from this coalfield. In all, 191 species, included in more than fifty genera, are enumerated. It is scarcely necessary to add that the author's high reputation for the accuracy of his deter-



SIGILLARIA ELEGANS
Restauration d'après MM. Grand'Eury et Kidston 1901.

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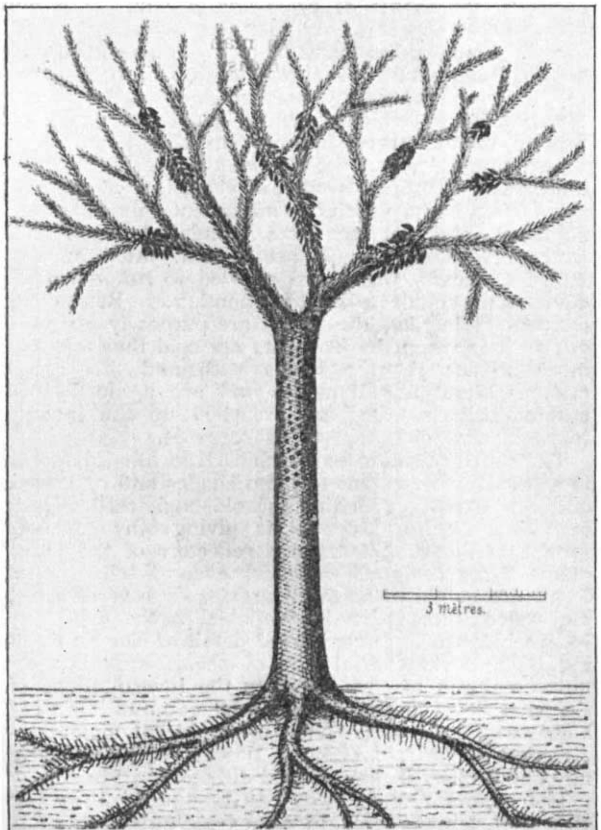
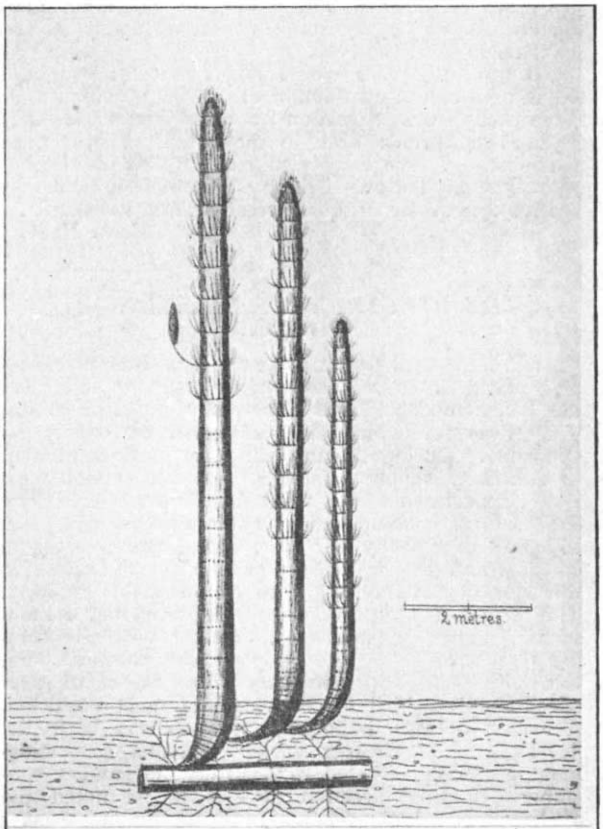
[1] Extrait des Mémoires du Musée royal d'Histoire naturelle de Belgique. Tome iv, "Les Végétaux Houillers recueillis dans le Hainaut Belge et se trouvant dans les Collections du Musée royal d'Histoire naturelle à Bruxelles." By Dr. R. Kidston, F.R.S. Année 1909. Pp. iv+282+xxiv plates. (Bruxelles: Polleunis et Centerick, 1911.)

minations and the completeness of his tables of synonymy is fully maintained in this large memoir.

The work is in the main an enumeration of the species represented in the collection, with lists of synonyms. In the case of many of the rarer or more difficult species, the author has added notes of a critical nature which are often of great value. We may, however, regret that he has not seen his way to give a description of each genus and species involved. Such diagnoses would have added very greatly to the value of the work. As it stands it resembles the shell of a nut without the kernel, and in practice one will require to make use of another work containing such descriptions, in conjunction with that now under discussion, whereas one volume might have sufficed. We do not overlook the fact that in the case of a considerable number of genera, including Renaultia, Sphenophyllum, and Asolanus among others, as well as certain species of Sphenopteris, Sigillaria, and the like, none of which are new to science, a full diagnosis has been included. But in the majority of cases the author has apparently thought any description unnecessary, even where no figure of the plant is given.



LEPIDOPHLOIOS
Restauration d'après M. Kidston 1901.



CALAMITES SUCKOWII
Restauration d'après M. Kidston 1901.

The number of new genera and species discussed is remarkably small. We notice only one new genus, Boweria, and two new species, both of Lepidodendron and Sigillaria. These with a couple of new seeds complete the list of new plants. The new genus is proposed for the reception of a widely distributed plant formerly known as *Renaultia schatzlarensis,* since its sporangia now prove to be annulate, and the genus Renaultia is reserved for certain plants with exannulate sporangia. Turning to the new Lycopods, *Lepidodendron simile,* of which, however, no diagnosis is given, appears to approach *L. lycopodioides,* Sternb.; and *L. belgicum* sp. nov., a stem in the Ulodendroid condition, which is fully described, has also some points of resemblance to Sternberg's species. The two new Sigillarias are both members of the straight-ribbed section with distant leaf scars, and of the type of *S. laevigata*, Brongn.

These and many other fossils are illustrated by twenty-four large plates from excellent photographs, reproduced with exceptional clearness. In the text there are forty-one smaller illustrations, all of a high average. Among these are twelve careful restorations from the author's own pencil of some of the most characteristic types of Carboniferous vegetation, such as *Sigillaria elegans,* a Lepidophloios, and *Calamites suckowi,* which are here reproduced. These embody the results of the author's lifelong practical experience of Carboniferous plants, and they are also interesting from the fact that in some cases they differ very remarkably from the restorations which are now to be found in most of our text-books. Without expressing any opinion on the accuracy of Dr. Kidston's drawings, we must, however, add that if these are faithful portraits of the plants of the period in question, the Carboniferous vegetation must have been even more weird in aspect than we had imagined.

Turning next to some further points of interest, we notice that the author, after many years' consistent use of the term Calamocladus for one particular type of Calamite foliage, has now apparently abandoned it for the alternative Asterophyllites, which usually commends itself to Continental workers. The point may appear to be a small one, but any change of importance as regards nomenclature at the hands of the leading authority on the systematic study of Carboniferous plants in this country is worthy of note. Among the plants more fully described, on which new contributions to our knowledge are offered, we would particularly direct attention to the stems and cones of *Calamites paleaceus,* Stur., *Selaginellites Gutbieri* (Gœpp.), *Pinakodendron ohmanni,* Weiss, and *Sphenophyllum majus* (Bronn). The memoir concludes with a discussion on the age and horizon of the Hainaut basin.

In conclusion, the Belgian palæobotanists may be congratulated on this noteworthy addition to the literature on their fossil floras, and on their good fortune in having secured such an authority as Dr. Kidston to fulfil the task.

To the author we would add our congratulations on the successful completion of a volume which must have occupied his attention for many years past, and will always rank high in the annals of systematic palæobotany. We may also express the pious hope that some day our own British Carboniferous flora may receive an equally adequate treatment at his hands.

E. A. N. A.

THE ELECTRICAL EXHIBITION AT OLYMPIA.

THE important lesson to be learned from the Electrical Exhibition at Olympia is that rapid strides are being made towards a period of hygiene in our daily lives for which electricity will be wholly responsible. During the last six years a large number of electricity supply companies and corporation electricity departments have reduced their price for energy for heating, cooking, and similar domestic purposes to about one penny per unit, and manufacturers of cooking and heating apparatus have been developing this side of the industry with commendable rapidity. The large percentage of firms exhibiting and demonstrating domestic appliances, together with the comparative absence of heavy electrical machinery at Olympia, sufficiently indicates the aspect of electrical supply which is receiving the most attention. A factor in this important problem has been the development of cheaper wiring systems, a development purposely directed to securing the smaller consumer. In this direction also is to be noted the tendency towards the production of smaller and cheaper meters, cheaper service boxes, main switches, and other auxiliary apparatus.

Another factor which is helping to render the installation of electric light more economical, and therefore further within the reach of the smaller user, is that, owing to small devices, such as lamp-holders, switches and fuses being manufactured in large quantities, and practically to a few standard designs, the cost of these is now far less than it was a few years ago. This brings us to mention what is perhaps the most remarkable sign of the development of the electrical industry to the ordinary thoughtful observer outside the industry itself. Fifty years ago, or even less, electricity, except in so far as its applications to telegraphy were concerned, was practically an abstract science, fascinating no doubt on account of its potential developments, but scarcely a serious factor in engineering. Now, however, not only is electricity a most important agent in practically all branches of engineering, but the manufacture of electrical plant and apparatus has assumed the proportions of a great industry. It is the commercial aspect of this industry which is so very clearly brought home to the visitor at the exhibition, especially in the case of those smaller pieces of electrical apparatus which form the bulk of the exhibits. The manufacture and sale of these has developed into an enormous trade, and one can see that the exhibitors at Olympia are not only engineers and electricians, but are business men and traders, in the widest acceptance of these terms.

To return to the actual exhibits. It will be noticed that one of the most outstanding features of the exhibition is the improvement in electric lamps. Only a few years ago the metal filament lamp was an object of scientific interest, the difficulties of even squirting the filament not then having been overcome to the extent of producing a lamp with any considerable degree of capability to withstand rough usage. Some of the metal filament lamps shown now are exhibited under conditions designed to illustrate that they are as strong mechanically as the carbon filament lamps which they are rapidly superseding. Several manufacturers are now making filaments of drawn tungsten, and the *clou* of the exhibition, from the electrical engineer's point of view, is a 16-c.p. 220-volt Osram lamp, which has a filament only 0·015 mm. diameter, and yet possesses wonderful mechanical strength. Other lamps are shown, fitted on two model tramcars, which are allowed to run down inclines and collide with one another. Before the moment of impact, the lamps are purposely switched off, as it is when the filaments are cold that they are more brittle; yet the lamps withstand this rough usage without any damage, and are again lighted automatically as they are propelled up the inclines to enable the operation to be repeated.

The standardisation to which we have alluded applies to a considerable extent to lamp shades and reflectors, and concurrently with this the old haphazard way of installing lighting systems is giving way to more precise methods. Shades and reflectors of the Holophane type, designed to effect even distribution of light, are exhibited as stock articles by several firms, and much information is available at the exhibition in this hitherto little considered detail of electric lighting. The most careful arts of the glassworker are now employed to give effect to the investigations of the student of optics in the production of diffusing globes and reflectors which, by conservation and redirection of the rays of light, prevent waste and give maximum effect in any desired direction.

The adaptability of electricity to artistic fittings is also well demonstrated in an exceedingly fine show of models to suit almost every style of architecture of the English and Dutch schools. There is also a display of some very dainty French crystal pendants, together with reproductions of the genuine old Dutch lighting fittings of the sixteenth and seventeenth centuries.

A new development that may be mentioned is in connection with the mercury-vapour lamp. A "light transforming reflector" is being introduced, made of a material which becomes fluorescent under the action of the light from the lamp, and increases the number of red rays; although this has not actually solved the problem of converting the light from the mercury-vapour lamp into a pure white light, it is at any rate a step in the desired direction.

The visitor who proposes only to spend a short time at the exhibition in which to form an idea of the numerous domestic applications of electricity to which we have alluded will find a large number of these concentrated in the "Electric Home." This is a